Entergy	NUCLEAR MANAGEMENT MANUAL	QUALITY RELATED	EN-DC-343	REV. 6
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Underground Piping and Tanks Inspection and Monitoring Program

Procedure Contains NMM eB REFLIB Forms: YES ☐ NO ☒

Effective Date	Procedure Owner:	Steven Woods	Governance Owner:	Oscar Limpias
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11/30/2012	Site:	PNPS	Site:	HQN

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N/A	NP		
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Site and NMM Procedures Canceled or Superseded By This Revision

Process Applicability Exclusion: All Sites: ☐
Specific Sites: ANO ☐ BRP ☐ GGNS ☐ IPEC ☐ JAF ☐ PLP ☐ PNPS ☐ RBS ☒ VY ☐ W3 ☐

Change Statement

Revision 6 is a revision to assure consistency with CEP-UPT-0100 and NEI 09-14.

Added/updated few references in section 2

Added/updated definitions in section 3 to match those included in NEI 09-14 Rev 1

Added responsibility in section 4 for System Engineering to report in the INPO Consolidated Entry System (ICES – formerly EPIX) ALL identified underground pipe/tank leakages

Relaxed requirement for applying API 570 when inspecting Piping/Tanks used to convey petroleum products in section 5.1

Added/updated few interfaces in section 6.0

Updated section 8.0

Revised Attachment 9.1 to include the option of using industry software.

Updated Attachment 9.2

Made some editorial changes

*Requires justification for the exception:

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1.0 PURPOSE

[1] This procedure provides the requirements for each site to develop its own site specific Underground Piping and Tanks (UPT) Inspection and Monitoring Program (hereafter referred to as the Program).

[2] This procedure provides a set of recommendations for Entergy nuclear power plants to use in implementing an effective program to detect and mitigate life-limiting degradation that may occur in underground piping systems and tanks. For plants that have received a renewed operating license, this procedure incorporates commitments for the Underground Piping and Tanks program. [LO-LAR-2008-0048 CA-0002, CA-0046] [RLC LO-LAR-2009-00244 CA-15] [RC07.2029.01] [NL-09-111] [P-16911] [A-17827] [A-17910].

[3] This procedure is intended to supplement programs currently established for monitoring internal Microbiologically Influenced Corrosion (MIC) or Flow Accelerated Corrosion (FAC) in systems as described in EN-DC-340 and EN-DC-315.

[4] The Program consists of inspection and monitoring of selected operational underground piping and tanks for external corrosion, including crevice, general corrosion, microbiologically influenced corrosion (MIC), pitting corrosion, and other age-related degradation. However, coordination with the MIC and FAC Program owners must continuously be achieved to assure the overall health (internal and external) of the underground piping and tanks.

[5] The details of the risk ranking criteria, reasonable assurance guidance, recommendations for inspection, monitoring, and mitigation portion of this Program are contained in Program Section CEP-UPT-0100. This procedure and CEP-UPT-0100 contain the required elements to provide guidance and recommendations for a programmatic approach to help Program Owners prioritize inspections of underground segments, evaluate the inspection results, make fitness for service decisions, select a repair technique where required, and take preventive measures to reduce the likelihood and consequence of failures.

2.0 REFERENCES

[1] NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," Rev. 2, December 2010

[2] Entergy Quality Assurance Program Manual (QAPM)

[3] NUREG-6876, "Risk-Informed Assessment of Degraded Buried Piping Systems in Nuclear Power Plants," June 2005

2.0 Cont.

[4] 10 CFR 54, “Requirements for Renewal of Operating Licenses for Nuclear Power Plants”

[5] 10 CFR 50, Appendix B “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants”

[6] ANSI N18.7-1976, “Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants”

[7] NUMARC 93-01 (NEI 93-01), “Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” April 2011

[8] NEI 95-10, “Industry Guideline for Implementing the Requirements of 10 CFR Part 54 –The License Renewal Rule,” June 2005

[9] NEI 07-07 Final, “Industry Ground Water Protection Initiative, Final Guidance Document”, August 2007

[10] EPRI 1021175, “Recommendations for an Effective Program to Control the Degradation of Buried and Underground Piping and Tanks (1016456 Rev 1)”, December 2010

[11] EPRI Report 1011829, “Condition Assessment of Large-Diameter Buried Piping, Phase 2: Vehicle Design and Construction”, December 2005

[12] INPO Operating Experience Digest OED 2007-09, “External Degradation of Buried Piping,” April 2007

[13] EPRI 1011905, “Cathodic Protection System Application and Maintenance Guide”, December 2005

[14] EPRI Report 1021470, “Balance of Plant Corrosion - The Buried Pipe Reference Guide”, December 2010

[15] NUREG-1801, Generic Aging Lessons Learned (GALL) Report, Rev 0 April 2001, Rev1 September 2005, and Rev 2 December 2010.

[16] API Standard 570, “In-Service Inspection, Rating, Repair, and Alteration of Piping Systems,” Third Edition, November 2009

[17] NACE Standard Recommended Practice RP-0502-2002, “Pipeline External Corrosion Direct Assessment Methodology”

2.0 Cont.

[18] NACE Standard Practice RP0169-2007, "Control of External Corrosion on Underground or Submerged Metallic Piping Systems"

[19] NACE Standard Test Method TM0497-2002, "Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Piping Systems"

[20] NEI-09-14 Rev 1 - Nuclear Energy Institute, "Guideline for the Management of Underground Piping and Tank Integrity", December 2010

[21] Engineering Report ECH-EP-10-00001, "Radiological SSC Groundwater Initiative Risk Evaluation Criteria", June 2010

[22] EPRI 1021561, "Inspection Methodologies for Buried Piping and Tanks", August 2010

[23] Standard EN-EP-S-002-MULTI, "Underground Piping and Tanks General Visual Inspection"

[24] EPRI 1016276, "An Assessment of Industry Needs for Control of Degradation in Buried Pipe", March 2008

[25] EPRI 1000115, "Evaluation of Torsional Guided Waves for Inspection of Service Water Piping", December 2000

[26] EPRI 1019115, "Buried Pipe Guided Wave Examination Reference Document", October 2009

[27] EPRI 1019157, "Plant Support Engineering: Guideline on Nuclear Safety-Related Coatings, Revision 2 (Formerly TR-109937 and 1003102)", December 2009

[28] CEP-NDE-0100, Administration and Control of NDE

[29] INPO 12-009, ICES Reporting Requirements and Standards, August 2012

3.0 DEFINITIONS

[1] Baseline Inspection – The inspection of a new or replaced pipe or component that has not previously been involved in plant operations.

[2] Buried Piping and Tanks - Piping and tanks that are below grade and in direct contact with the soil or concrete (e.g. a wall penetration or embedded in concrete).

3.0 Cont.

[3] Cathodic Protection (CP) – The application of a current to the outside surface of the pipe with the purpose of reducing the susceptibility of exposed segments of buried pipe (exposure caused by coating deterioration, damage or voids) to corrosion. The application of a low voltage residual current causes a shift (with respect to the anode) of the electrolytic potential at pipe exposed sites and thereby places the pipe in a more protected, less corrosive environment.

[4] Component – A portion of an underground piping or tank system with defined boundaries.

[5] Concrete Piping – Piping that is manufactured from concrete or cementitious material with or without metallic reinforcement. Concrete piping is generally used for large diameter lines such as the water intake piping from sources of cooling water (e.g., lakes, rivers, and reservoirs).

[6] Corrosion – The chemical or electrochemical reaction between a material, usually a metal, and its environment that produces a deterioration of the material and its properties. A common example is the oxidation of an iron-based alloy exposed to water (rusting).

[7] Crevice Corrosion – Localized corrosion that may occur in areas of stagnant solutions existing in crevices, joints, and contacts between metals or between metals and non-metals.

[8] Direct Examination – A Nondestructive Evaluation (NDE) examination where the NDE sensor(s) is in immediate contact with or in close proximity to the section of the component being examined. Results provide some degree of quantitative measurement of wall thickness or discontinuity size. Direct examinations can be performed from the interior or exterior surface. Detection and characterization capabilities vary by NDE method as well as by specific NDE technique. Examples of NDE methods include ultrasonics, eddy current, radiography, visual and various electromagnetic techniques. Visual examinations [das1]should be supplemented with NDE or engineering judgment that addresses the condition of the pipe wall.

[9] Erosion – Deterioration of materials by the abrasive action of moving fluids or gases, usually accelerated by the presence of solid particles or gases in suspension. When corrosion occurs simultaneously, the term Erosion/Corrosion is often used.

[10] General Corrosion – This type of corrosion attacks the entire un-protected surface in a uniform manner. Of all types of corrosion, this is the least damaging and easiest to determine or quantify the corrosion rate. (Also referred to as uniform corrosion).

3.0 Cont.

[11] Holidays – Discontinuities in coatings, (e.g., pinholes, voids)

[12] Indirect Inspection – Survey techniques used to assess the likelihood of degradation without having direct access to the section of the component being examined. These inspections typically measure surrounding conditions that may be indicative of corrosion or damage. Results are typically qualitative and less accurate than direct examinations. Examples of indirect inspection methods include over-the-line surveys and for the purpose of this document, long range guided wave.

[13] Initial Inspection – The inspection of a pipe or component that has been in-service but has not been previously inspected..

[14] Inspection Program – A systematic evaluation of in-scope underground components using various techniques [e.g., ultrasonic testing (UT), radiographic testing (RT), visual testing (VT), leak testing (LT), eddy current testing (ET)].

[15] Licensed Material – Licensed material (from 10 CFR 20.1003) (or licensed radioactive material) means source material, special nuclear material, or byproduct material received, possessed, used, transferred or disposed of under a general or specific license issued by the Commission and/or by the state [e.g. State Pollution Discharge Elimination System (SPDES)]. Components containing radioactive licensed material covered under NEI 09-14 should be consistent with those identified in NEI 07-07.

[16] Microbiologically Influenced Corrosion (MIC) – Corrosion caused by the presence and/or activities of microorganisms in biofilms on the surface of the material. Microorganisms have been observed in a variety of environments that include seawater, natural freshwater (lakes, rivers and wells), soils and sediment. Microbiological organisms include bacteria, fungi and algae.

[17] Opportunistic Inspection – An inspection performed when underground components are exposed or excavated due to another activity providing an opportunity to inspect and document the results for a program component.

[18] Pitting – A form of localized corrosion that results in the formation of small, sharp edged cavities in a metal.

[19] Quality Assurance Classification – For the purposes of this procedure, Safety Class or QA Category is used to designate safety classification. Refer to EN-DC-167 for a summary of the corresponding “legacy” classifications formerly used at each plant and how they are classified as safety related, augmented, and non-safety related.

[20] Redox – Of or relating to oxidation-reduction.

3.0 Cont.

[21] Resistivity – The longitudinal electrical resistance of a uniform rod of unit length and unit cross-sectional area. The reciprocal of conductivity.

[22] Soil Resistivity Measurement – A method of subsurface detection which measures changes in conductivity by passing electrical current through ground soils. This is generally a consequence of moisture content, and in this way, buried features can be detected by differential retention of groundwater.

[23] Subsequent Re-inspection – The inspection of a component that has been previously subjected to a Baseline Inspection and/or an Initial Inspection.

[24] Tunnel - A structure that is outside of a building, below grade, designed to accommodate personnel, and not routinely accessible.

[25] Underground Piping – All piping that is below grade, not accessible, and outside of buildings. Underground piping may or may not be in direct contact with soil or concrete. This includes piping that is directly buried and those that are embedded in concrete or located in underground concrete vaults, tunnels, or guard pipes. Buried piping is considered to be a subset of underground piping

[26] Underground Tank - All tanks that are outside of buildings and sufficiently below grade such that there is a reasonable possibility that leakage from inaccessible portions of the tank may not be detected. These tanks are below grade and may or may not be in direct contact with soil or concrete. This includes tanks that are directly buried and those that are embedded in concrete or located in underground concrete vaults or tunnels.

[27] Uniform Corrosion – See “General Corrosion”.

[28] Vault - A structure that is outside of a building, below grade, not designed to accommodate personnel and not routinely accessible.

[29] Visual Inspection – involve direct observation by inspectors or by the use of remote visual inspection devices. Visual inspections may include the use of pit gauges to assess the extent of any degradation noted.

4.0 RESPONSIBILITIES

[1] The **Director, Engineering (Headquarters),** is responsible for:

a) Providing corporate management, governance, and oversight of UPT Program activities from a fleet perspective.

4.0 [1] Cont.

b) Ensuring fleet focus and alignment of the UPT Program implementation.

c) Monitoring UPT Program health, assessment results, and ensuring fleet coordination of UPT Program activities.

[2] The **Director, Engineering (Site),** is responsible for:

a) Overall development, maintenance, administration, and control of the UPT Program.

b) Ensuring coordination of the UPT Program activities among the various departments involved at the applicable site.

[3] The **Manager, Programs & Components (Headquarters),** is responsible for:

a) Providing governance for the UPT Program across the fleet.

b) Standardizing the UPT Program from site-to-site.

c) Resolving conflicts that may arise in the interpretation of this procedure.

[4] The **Manager, Programs & Components (Site),** is responsible for:

a) Implementing all aspects of this Program at the station.

b) Ensuring that all activities associated with this Program are performed in a timely and cost efficient manner commensurate with the risk and safety significance of the issue.

c) Allocating adequate resources as necessary to implement this Program.

d) Ensuring adequate training of UPT Program owners, site implementers, and backup personnel.

[5] The **Supervisor, Programs & Components (Headquarters),** is responsible for:

a) Providing management oversight of the UPT Program across the fleet.

b) Coordinating fleet resources to participate in UPT Program assessments and benchmarks, as required.

4.0[5] Cont.

c) Ensuring (i.e., in cooperation with UPT program owners from other sites) that industry activities specific to the UPT Program are adequately supported by the fleet.

[6] The **Supervisor, Programs & Components (Site),** is responsible for:

a) Assigning a Program Owner to develop, implement, and maintain the site's Program in accordance with this procedure.

b) Ensuring the timely completion of inspections.

[7] The **Program Owner (Headquarters),** is responsible for:

a) Maintaining cognizance of industry issues/events, operating experience, best practices, and NRC expectations.

b) Coordinating with site implementation personnel and management, as necessary, to ensure effective implementation of the UPT Program.

c) Coordinating and participating in periodic assessments of the UPT Program across the fleet using the guidance provided under EN-LI-104.

d) Coordinating periodic meetings and teleconference calls with UPT Program owners.

e) Providing clarification or interpretation of the UPT Program procedural, regulatory, and code requirements.

f) Act as the point of contact for external organizations (e.g. NEI, INPO)

g) Reviewing UPT Program performance indicators and health reports across the fleet.

[8] The **Program Owner (Site),** is responsible for:

a) Developing, implementing, and maintaining a site specific Program in accordance with the requirements of this procedure and EN-DC-174.

b) Developing Program and inspection documents.

c) Reviewing site maintenance records for designated underground piping/tanks to determine if previous maintenance and inspections can be credited for extended period of operation inspection requirements.

4.0 [8] Cont.

d) Initiating Condition Reports (CRs) for inspected conditions that fail to meet the acceptance criteria.

e) Creating and updating the program database.

f) Interfacing with other discipline Engineers as required in order to implement this procedure.

[9] The **Design Engineering** personnel **(Site),** is responsible for:

a) Supporting Program Owner in developing and maintaining a site specific Program in accordance with this procedure.

b) Developing Acceptance Criteria for underground piping and tanks.

c) Supporting the review of inspection results and evaluations.

[10] The **System Engineering** personnel **(Site),** is responsible for:

a) Ensuring that the site CP System is evaluated for proper operation and that routine maintenance and surveillance testing is being performed.

b) Verifying that proper acceptance criteria have been established for evaluation of the CP test results.

c) Confirming that the CP System is annually evaluated by a National Association of Corrosion Engineer certified specialist as recommended by EPRI 1021175.

d) Reporting in the INPO Consolidated Entry System (ICES) ALL identified underground pipe/tank leakages (INPO 12-009).

5.0 DETAILS

5.1 PRECAUTIONS AND LIMITATIONS

[1] The risk of a failure caused by corrosion, directly or indirectly represents the most common hazard associated with underground piping and tanks. The corrosion risk assessment, described in CEP-UPT-0100, is organized into categories reflecting four factors (soil resistivity, soil drainage, piping/tank material type, and CP/coating) that impact the degree of corrosion risk due to design and environmental conditions.

5.1 Cont.

[2] Building the risk assessment tool requires the following four steps:

a) Segmenting: dividing a system into smaller segments. The size of each segment shall reflect practical considerations of operation, maintenance, and cost of data gathering with respect to the benefit of increased accuracy.

b) Customizing: deciding on a list of risk contributors and risk reducers and their relative importance.

c) Data gathering: building a database by completing an evaluation for each segment of the system.

d) Maintenance: identifying when and how risk factors can change and updating these factors accordingly.

[3] Be aware that backfilling an excavated area could increase the corrosion susceptibility in that area of the buried piping or tank due to changing soil conditions. Consider re-using the same (or less corrosive) backfill in areas that are excavated.

[4] When the inspection entails unearthing a segment, caution shall be used so as to not disturb the protective exterior coating or the CP system, as applicable.

[5] Piping/Tanks used to convey petroleum products may be inspected by an authorized inspection agency in accordance with the provisions of API 570 or by a qualified inspector in accordance with CEP-NDE-0100 and EN-EP-S-002-MULTI.

[6] Work Orders involving excavation should consider including a task for the Site UPT, Site MIC, Site FAC, and Site Structures Monitoring Program Owners to be notified for possible opportunistic inspections. [LO-LAR-2008-0048 CA-2] [LO-LAR-2008-0048 CA-46] [RLC LO-LAR-2009-00244 CA-63] [RC07.2029.01] [RC07.2029. 50] .[A-17827] [A-17910] [P-16911] [NL-09-111]

[7] New underground segments that are installed in the plant shall be inspected and documented by the Program Owner prior to burial. Coating condition, backfill/trench soil conditions, associated CP, baseline inspection data, etc. are items that should be documented.

[8] The use of new technologies to establish component condition should be an indicator to be reviewed on a continuous basis. Existing technologies are being enhanced and applied in innovative solutions. Like other fields, it is important that the Program Owner learns from plant experiences, strives to apply new technologies important in identifying component failures, and seeks to develop innovative means to apply existing technologies.

5.2 PROCEDURES AND OVERSIGHT

[1] Each Program Owner must take advantage of site excavating activities to perform opportunistic inspections. [LO-LAR-2008-0048 CA-0002] [RC07.2029.01] .[A-17827] [A-17910] [RLC LO-LAR-2009-00244 CA-63] [NL-09-111] [P-16911]

[2] CEP-UPT-0100 details the program requirements associated with scope, risk ranking, and examination techniques.

[3] A long range plan for each plant should exist to ensure plant management is aware of funding requests and long term health of plant underground piping and tanks.

[4] Program performance indicators and health reports in accordance with EN-DC-329 also ensure program health and communication with plant management.

[5] Each Program Owner shall be qualified in accordance with the Entergy fleet qualification card.

[6] Industry training should also be included in the training of the Underground Pipe and Tanks Program Owner.

5.3 RISK RANKING

[1] Two options for performing risk ranking of a given location (segment) can be used. The first option utilizes risk analysis, where the risk is equal to a quantified likelihood of the failure times the quantified consequences of the failure. The second option, detailed in CEP-UPT-0100, places each location (segment) into a risk matrix based on a non-quantified likelihood of failure (i.e., low, medium, and high) versus the non-quantified consequences of failure (i.e., none, low, medium, and high). Both approaches require inspection of a prioritized sample of risk-ranked locations and should prevent most leaks and failures of Underground systems.

[2] Computer software can be used to model underground segments to help determine the likelihood of failure and the consequence of failure. The computer modeling can substitute for the manual risk ranking as described in CEP-UPT-0100 and Engineering Report ECH-EP-10-00001.

[3] A set of as-built drawings should be assembled showing the route of underground segments, including their location relative to other underground and above ground buildings, structures, and commodities.

[4] An underground segment whose failure is inconsequential and would cause no direct or collateral damage to plant SSC's may be excluded from the scope of the program. A formal write-up for that exclusion should be considered.

5.3 Cont.

[5] Line specific data shall be collected and compiled for use in risk ranking, inspection, planning, and fitness for service assessment. The line may be subdivided into segments of similar characteristics. Lines that have similar design characteristics but have physical elevation differences should be segregated into upper and lower elevations in relationship to groundwater and drainage. The lower elevations of these lines (i.e., wetter ground) should be a higher inspection priority.

[6] Soil samples should be collected for analysis to help assess the likelihood of outside diameter corrosion.

[7] Where underground segments are protected by a CP system, the CP system should be annually inspected and tested to assess its continued adequacy.

[8] An impact assessment (Safety Class, Public Risk, and Economics) shall be conducted to help rank components/segments (see CEP-UPT-0100).

[9] The potential for corrosion of underground segments shall be evaluated to determine the likelihood of failure for each pipe segment (see CEP-UPT-0100).

[10] Underground radiological piping and tanks are by definition considered “High Risk” in this Program due to industry operating experience and the resulting public concern. Consequently, all radiological underground piping/tanks are assigned a “High” inspection priority

[11] The “High Risk” characterization of underground radiological piping and tanks will be further categorized into “High–Low”, “High–Medium” and “High–High” risk per Engineering Report ECH-EP-10-00001. This will allow for relative ranking of one High Risk radiological component versus another.

5.4 INSPECTIONS

[1] In general, inspections should be performed at the segments that have the highest risk ranking as determined above. Other considerations such as access and cost may also be considered when the relative risk rankings are similar.

[2] The applicable Code required minimum design thickness, t_{min}, to be used in the fitness-for-service assessment should be determined before performing direct examinations, if possible.

[3] Classic non-destructive examinations (surface and volumetric) are performed either by entering the segment (if sufficiently large) with the use of robots or pigs, by tools using electronic scanning techniques or by excavation to the segment surface, following plant procedures. Indirect inspection tools such as Direct Current Voltage Gradient (DCVG) and Guided Wave can assist the inspection process as a screening tool.

5.4 Cont.

[4] When an underground segment is uncovered, the coating should be inspected by an experienced qualified person in accordance with Standard EN-EP-S-002-MULTI. The results should be documented and include relevant photographs or video. When an underground segment is uncovered (OD) or entered internally (ID) for any reason, as a minimum it should be visually inspected for evidence of corrosion or damage. Particular attention should be paid to the joints, especially welds, as they often are more susceptible to degradation than the base metal. [A-16753] [LO-LAR-2010-00232]

[5] The results of the inspection should be documented using Standard EN-EP-S-002-MULTI and any relevant photographs or videos should be included in the Program Notebook.

[6] A volumetric examination technique should be used to determine wall loss, measure remaining thickness, or examine a weld. Results shall be evaluated for fitness-for-service.

[7] There are several NDE methods that are applicable to underground piping inspections. See EPRI Report 1021175, EPRI IR-2010-409, and CEP-UPT-0100 for further discussion on NDE methods.

[8] The following are general parameters to be inspected and documented for future reference [refer to CEP-UPT-100, section 5.2.24]:

a) External coating and wrapping condition.

b) Pipe wall thickness degradation.

c) Tank plate thickness degradation.

d) CP System Performance (if applicable).

[9] A CR shall be initiated if degradation is identified or the acceptance criteria are not met.

5.5 FITNESS FOR SERVICE (FFS) [LO-LAR-2008-0048-0002] [RC07.2029.01] [A-17827] [A-17910]

[1] The integrity assessment shall be based on the design analysis of the underground system.

[2] The inspection results shall be compiled and categorized. A projection of future damage shall be estimated based on current inspection results, planned repairs, and the time to the next planned inspection or repair.

5.5 Cont.

[3] Methods and criteria should be in place prior to inspections to assess the significance of inspection results by applying the appropriate FFS assessment method, consistent with the damage mechanism and licensing commitments. [Refer to CEP-UPT-0100, section 5.5].

[4] The knowledge gained through the FFS process should be used to review and adjust as necessary the risk ranking and the inspection plan.

[5] A Condition Report (CR) shall be written if degradation is identified or acceptance criteria are not met [refer to CEP-UPT-0100, section 5.5]. The corrective actions may include engineering evaluations, scheduled inspections, and change of coating or replacement of corrosion susceptible components. Components that do not meet the acceptance criteria shall be dispositioned by engineering via the Engineering Change (EC) process (EN-DC-115).

[6] Identified degraded conditions that are “accepted as is” should be included in the Margin Management Database as appropriate per EN-DC-195.

5.6 REPAIRS

[1] Contingency planning should be in place for prompt implementation in case an underground segment fails to meet acceptance criteria.

[2] The detailed design of the selected repair option should accommodate the specifics of the failed line.

[3] Leak detection techniques and leak isolation options should be pre-selected for prompt implementation should a leak occur.

5.7 PREVENTION, MITIGATION AND LONG TERM STRATEGY

[1] Where the risk of failure is unacceptable, preventive measures and options to mitigate the possible leakage should be implemented.

[2] Newly installed underground piping and tanks should be coated as applicable during installation with a protective coating system in accordance with site specifications. These coatings include coal tar enamel with fiberglass wrap and a Kraft paper outer wrap, a polyolefin tape coating, or a fusion bonded epoxy coating. These coatings help protect the piping and tanks from contacting the aggressive soil environment. As part of preventive measures, the existing CP system may be updated or a new CP system may be installed. [P-16911] [IP-RPT-11-LRD-07]

[3] Whenever components are excavated, then careful and stringent controls shall be in-place to assure proper or improved fill material is used to re-bury the component.

5.7 Cont.

[4] Baseline inspections shall be performed prior to piping installation. Pipe coating, trenching condition, backfill/bedding materials, and any nearby CP are items that can be documented in the Program Notebook.

[5] For plants with installed CP systems for underground piping and tanks, ensure Preventive Maintenance tasks exist to verify proper operation of these systems (recommended at least semi-annually). Verify corrective maintenance tasks for CP system identified deficiencies are corrected on a schedule commensurate with the safety significance of the system/component being protected.

[6] Operating Experience (OE) reviews are to be included as part of the Underground Piping and Tanks Program Notebook.

6.0 INTERFACES

[1] Engineering Standard EN-CS-S-008-MULTI, "Pipe Wall Thinning Structural Evaluation"

[2] CEP-NDE-0112, "Certification of Visual Examination Personnel"

[3] CEP-UPT-0100, "Underground Piping and Tanks Inspection and Monitoring"

[4] EN-AD-103, "Document Control and Records Management Programs"

[5] EN-DC-115, "Engineering Change Process"

[6] EN-DC-134, "Design Verification"

[7] EN-DC-141, "Design Inputs"

[8] EN-DC-147, "Engineering Reports"

[9] EN-DC-167, "Classification of Structures, Systems, and Components"

[10] EN-DC-174, "Engineering Program Sections"

[11] EN-DC-195, "Margin Management"

[12] EN-DC-315, "Flow Accelerated Corrosion Program"

[13] EN-DC-340, "Microbiologically Influenced Corrosion (MIC) Monitoring Program"

[14] EN-IS-112, "Trenching, Excavation, and Ground Penetrating Activities"

[15] EN-TQ-104, "Engineering Support Personnel Training Program"

[16] EN-QV-111, "Training and Certification of Inspection/Verification and Examination Personnel"

[17] EN-WM-100, "Work Request (WR) Generation, Screening and Classification"

[18] EN-WM-101, "On-Line Work Management Process"

[19] EN-DC-329, "Engineering Programs Control and Oversight"

[20] EN-LI-102, "Corrective Action Process"

[21] FTK-ESPP-G00121, "Underground Piping/Tanks Program Owner"

6.0 Cont.

[22] EN-LI-104, “Self-Assessment and Benchmark Process”

[23] EN-CY-111, “Radiological Ground Water Monitoring Program”

7.0 RECORDS

[1] All data generated during the course of underground piping and tanks inspections should be referenced or retained by the Program Owner in the program notebooks. Follow applicable QA retention requirements and guidance contained in EN-DC-329.

[2] Records, evaluations and reports generated as a result of the periodic inspections shall be retained and maintained in accordance with EN-AD-103 and as directed in the site Program, as applicable.

[3] Changes to the Program based on the periodic review shall be performed in accordance with EN-DC-174, Engineering Program Sections.

8.0 SITE SPECIFIC COMMITMENTS

Step	Site	Document	Commitment Number or Reference
1.0[2], 5.1[6], 5.2[1], 5.5	ANO1	License Renewal Commitment	A-17827
1.0[2], 5.1[6], 5.2[1], 5.5	ANO2	License Renewal Commitment	A-17910
1.0[2], 5.1[6], 5.2[1]	IPEC	License Renewal Commitment	NL-09-111
5.7 [2], Attachment 9.2	IPEC	License Renewal Commitment	IP-RPT-11-LRD07, Items 1b & 1a
All, 1.0[2], 5.1[6], 5.2[1], 5.5	JAF	License Renewal Commitment	LO-LAR-2008-0048 CA-2
1.0[2], 5.1[6]	JAF	License Renewal Commitment	LO-LAR-2008-0048 CA-46 (Underground fuel storage tanks)
1.0[2], Attachment 9.2	PLP	License Renewal Commitment	RLC LO-LAR-2009-00244 CA-15 (Implement buried services monitoring program)
Attachment 9.2	PLP	License Renewal Commitment	RLC LO-LAR-2009-00244 CA-69 (Inspect below grade fire piping)

8.0 Cont.

Step	Site	Document	Commitment Number or Reference
5.1[6], 5.2[1], Attachment 9.2	PLP	License Renewal Commitment	RLC LO-LAR-2009-00244 CA-63 (Buried structures opportunistic inspection)
5.4	PLP	License Renewal Commitment	RLC LO-LAR-2009-00244 CA-38 (Perform inspection of a sample of buried piping?
All, 1.0[2], 5.1[6], 5.2[1], 5.5	PNPS	License Renewal Commitment	RC07.2029.01
5.1[6]	PNPS	License Renewal Commitment	RC07.2029.50
1.0[2], 5.1[6], 5.2[1], 5.7[2], Attachment 9.2	VTY	License Renewal Commitment	P-16911
5.4[4]	VTY	License Renewal Commitment	A-16753 (LO-LAR-2010-00232)

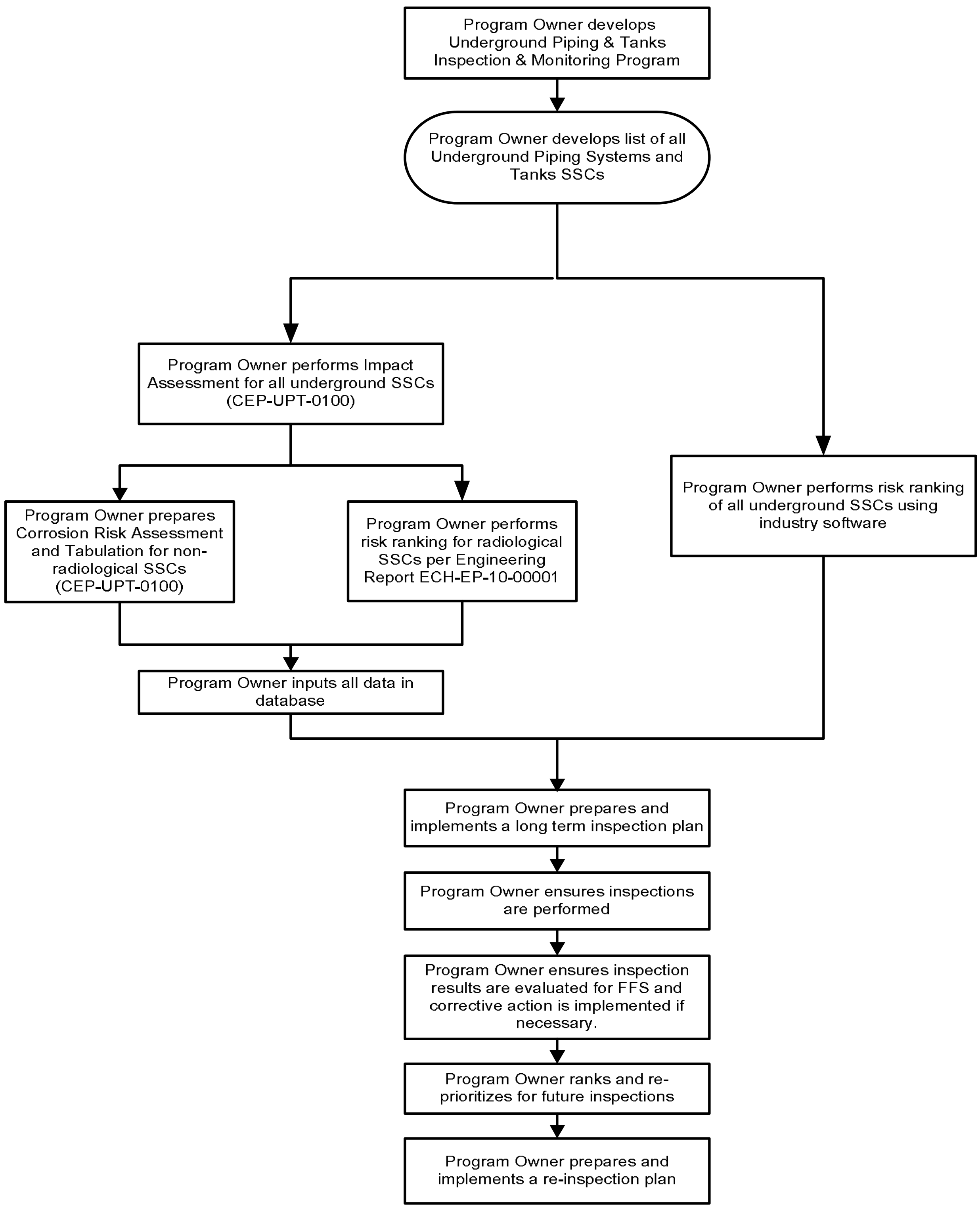
9.0 ATTACHMENTS

[1] Roadmap for Underground Piping and Tanks Inspection and Monitoring Program

[2] List of Affected Underground Piping Systems as per Licensing Renewal Application (LRA)

ATTACHMENT 9.1 **ROADMAP FOR UNDERGROUND PIPING AND TANKS INSPECTION AND MONITORING PROGRAM**

Sheet 1 of 1



ATTACHMENT 9.2 LIST OF AFFECTED UNDERGROUND PIPING SYSTEMS AS PER LICENSE RENEWAL APPLICATION (LRA)

Sheet 1 of 2

Station	System
ANO	Unit 1 Service Water System
	Unit 2 Service Water System
	The plant's Joint Fire Protection Loop
	Fuel Oil
GGNS	TBD
IPEC	City Water
	Containment Spray (IP3 only)
	Fire Protection - Water System
	Fuel Oil
	Plant Drains
	Safety Injection
	Security Propane Generator (IP3 only)
	Service Water
	Auxiliary Feedwater System
	River Water System (IP1 only)
	Circulating Water (IP2 only)
	Containment Isolation Support System
JAF	Condensate Storage
	Fire Protection - Water System
	Fuel Oil
	HPCI
	RCIC
	Radwaste and Plant Drains
	Security Generator
	Standby Gas Treatment
PNPS	Condensate Storage
	Fire Protection - Water System
	EDG Fuel Oil
	Salt Service Water
	Standby Gas Treatment
	Station Blackout DG Fuel Oil & Cooling Water

Attachment 9.2 List of Affected Underground Piping Systems as per License Renewal Application (LRA)
Sheet 2 of 2

Station	System
PLP	Condensate System
[RLC LO-LAR-2009-00244 CA-69,	Demineralized Water System
CA-15, CA-38, CA-63]	Diesel Fuel Oil System
	Feedwater System
	Fire Protection System
	Miscellaneous Gas System
	Radioactive Waste System
	Service Water System
RBS	TBD
VY	Fire Protection - Water System
[P-16911]	Fuel Oil
	Service Water
	Standby Gas Treatment
W3	TBD